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Science and Technology for Tomorrow's Aerospace Forces

Success Story

INFLATABLE STRUCTURES CAN REDUCE LOGISTICS AND SETUP TIME FOR BARE-BASE OPERATIONS



Shelters made with inflatable air beam technology could greatly reduce the manpower required to set up deployable shelters, as the existing shelter requires eight people and the inflatable shelter requires five. Researchers expect to reduce deployment time by 75% and labor hours required by deployed forces to construct shelters by nearly 85%. Researchers anticipate the shelters to be 60% lighter and to require only a single shipping container in lieu of three, which will allow twice as many shelters shipped per transport aircraft.



Air Force Research Laboratory
Wright-Patterson AFB OH

Materials and Manufacturing
Emerging Technologies

Accomplishment

Researchers at the Materials and Manufacturing Directorate, in conjunction with the Army, are developing a new temporary aircraft shelter for deploying forces that is significantly lighter, faster to transport, and easier to construct. The inflatable structure will dramatically reduce deployment logistics including the amount of time, people, and aircraft required to set up bare-base operations.

Background

One major concern for forces deploying to bare-base locations is constructing large shelters for use as aircraft hangars, maintenance facilities, and storage warehouses. Many of the current shelters use aluminum frame tent technology and take several civil engineers many hours to days to construct.

A six-year cooperative research and development effort between the directorate's Deployed Base Systems Branch at Tyndall AFB, Florida and the US Army Soldier and Biological Chemical Command at Natick, Massachusetts, produced inflatable textile air beams to replace the heavier aluminum structural frame. These high-performance beams feature high strength under applied loads, high stiffness, low weight, and high overload to deflect weight or load without damage. Researchers expect air beam-supported shelters to protect aircraft against environmental effects and provide a controlled environment for maintenance, while reducing the amount of time and energy required to deploy, construct, and maintain a functional shelter.

During the summer of 2001, the branch evaluated two small-sized shelters at their facilities at Tyndall AFB. During fiscal years 2002 and 2003, researchers expect to choose a manufacturer, based on this testing, to design, build, demonstrate, and evaluate a shelter large enough to house an aircraft.

Follow-on efforts will incorporate smart skin for protection against toxic chemical effects, integrate next-generation power utilities, and accelerate the transition of all other bare-base shelter support equipment. In addition, the air beam technology manufacturers anticipate numerous technology spin-offs useful to the military services.

Additional information

To receive more information about this or other activities in the Air Force Research Laboratory, contact TECH CONNECT, AFRL/XPTT, (800) 203-6451 and you will be directed to the appropriate laboratory expert. (01-ML-18)